

Appl. No. 09/852,267
Response filed on December 4, 2002

REMARKS

Applicants thank the Examiner for the thorough consideration given the present application. Claims 1-10 are currently under consideration. Claims 11-19 have been withdrawn from consideration. The Examiner is respectfully requested to reconsider his rejections in view of the amendments and remarks as set forth below.

Telephone Interview

Applicants note with appreciation the courtesies extended by Examiner Lin in granting a telephone interview held on December 2, 2002. In the telephone interview, the outstanding rejection was discussed, along with Applicants' arguments included herewith. Applicants are submitting the present amendment in order for these arguments be given consideration.

Claim for Priority

It is gratefully acknowledged that the Examiner has recognized Applicants' claim for foreign priority and the receipt of the certified copies. In view of the fact that Applicants' claim for foreign priority has been perfected, no further action is required from Applicants at this time.

Drawings

It is gratefully acknowledged that the Examiner has accepted the formal drawings filed on May 10, 2001 for examination purposes. It is respectfully submitted that the formal

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drawings comply with the requirements of the U.S. Patent and Trademark Office. If the Official Draftsperson has any objections to the formal drawings, he is respectfully requested to contact the undersigned as soon as possible so that appropriate action may be taken.

Acknowledgement of Information Disclosure Statement

The Examiner has acknowledged the Information Disclosure Statements filed on March 22, 2002 and July 11, 2002. Initialed copies of the PTO-449 have been received from the Examiner. No further action is necessary at this time.

Rejection under 35 U.S.C. § 103

Claims 1-9 stand rejected under 35 U.S.C. § 103 as being obvious over any one of Beetle et al. (3302919), Monroe et al. (5896912), or Buchborn (5954113) in view of Webbere (2770860). Alternately, the claims are rejected as being obvious over Webbere in view of any one of Beetle et al, Monroe et al, or Buchborn. These rejections are respectfully traversed.

The Examiner states that each of the three references shows it is conventional to provide a feeder head for feeding molten metal into a mold cavity during solidification to prevent surface sink. The Examiner also states that it would have been obvious to provide the deoxidizing compound of Webbere in the process of any of the three references to reduce the oxide film. Alternatively, it would have been obvious to provide the mold of Webbere with the feeder head of any of the three references.

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Claim 1 recites a combination of steps of a method of casting where the feeder head is provided between a metal inlet and a cavity and where the heat insulating of the feeder head is greater than that of the cavity so as to make cooling rate of the feeder head lower than that of the cavity, including steps of pouring a molten metal into the cavity, reacting the molten metal with a deoxidizing compound in the cavity so as to deoxidize an oxide film formed on a surface of the molten metal and supplementing the molten metal in the feeder head to the cavity when the molten metal has solidified and shrunk.

Apparently, the Examiner has recognized that the three references do not show the step of reacting the molten metal with the deoxidizing compound and relied on the Webbere reference to show this step. However, Applicants disagree that the Webbere reference teaches this step. In this reference, the surface of the molten metal is covered with the gas to prevent formation of an oxide film. The compound used, dichlorodifluoromethane, is a chemically stable compound and is commonly known as freon 12, which is used as a refrigerating agent. Since this compound is chemically stable, it cannot be used as a deoxidizing compound to bond with the oxygen of the metal oxide film. The reference does not show use of any material as a deoxidizing compound, rather merely provides the gas to displace any oxygen around the metal and thus prevent contact of the metal to the oxygen. Column 2, lines 6 and 7 refer to a "non-oxidizing gas atmosphere". There is a difference between non-oxidizing and deoxidizing. Also, column 2, lines 20-24 state that the gases are used over the metal surface during casting to eliminate oxide occlusions formed when such an alloy is poured in air. Column 3, line 25 states that the gas provides a heavy atmosphere in the furnace which is not readily

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displaced by air. All these statements indicate that the use of the freon gas is to merely displace oxygen therefrom so that the metal surface does not contact oxygen to form an oxide, rather than deoxidizing a metal oxide. Accordingly, Applicants submit that the Webbere reference does not show this step and the combination of references does not meet the combination of steps described in claim 1. In particular, the steps of claim 1 require that the molten metal react with the deoxidizing compound in the cavity. The references do not show a reaction with a metal deoxidizing compound since there is no compound which deoxidizes. Rather, there is only a non-oxidizing gas and it does not react with a molten metal. For these reasons, Applicants submit that claim 1 is patentable over this combination of references.

Claims 2-9 depend from claim 1 and as such are also considered to be allowable. In addition, many of these claims recite additional features, which when combined with the combination of steps described in claim 1 form additionally patentable claims. Thus, claim 2 describes the cooling rate of a cavity and a feeder head which is not seen in the references. Likewise, claim 3 describes the cooling rate in terms of the clearances between dendrites of the aluminum, which is not described or suggested in the references. Claim 4 similarly describes the coating of the feeder head but not the cavity with an insulating lubricant. This is not described in any of the references. Likewise, the remaining claims also present additional limitations to make these claims additionally allowable.

Claim 10 stand rejected under 35 U.S.C. § 103 as being obvious over the four references described above taking in view of Shekhter et al. (6171363). The Examiner states this reference shows that magnesium gas can be used as a reducing agent.

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Moreover, it is noted that this reference does not teach reacting a magnesium gas with nitrogen gas to form a deoxidizing compound which reacts with a molten metal. Accordingly, Applicants submit that claim 10 is additionally allowable.

Obviousness Type Double Patenting

Claims 1-10 stand rejected under the judicially created doctrine of obviousness-type double patenting as being obvious over claims 1-7 of Application No. 10/097,483 or claims 1-9 of Application 10/115,141. Also claims 1-10 stand rejected over claims 1-24 of copending Application No. 10/166,743 in view of any of the three primary references applied in the obviousness rejection. These rejections are respectfully traversed.

Applicants submit that in each case, the language of the present claims differs from the claims of the other applications sufficiently that the differences would not be obvious to one having ordinary skill in the art. In regard to Application 10/097,483, the claims of that application are being amended at the present time as well. In that application, claim 1 is being canceled and claims 2 and 3 being placed in independent form. Claim 2 requires that the molten metal be pressed toward the cavity so as to make the outline of the cast product correspond to the desired product. This limitation is not seen in any fashion in the present application.

Likewise, claim 3 of that application requires that the molten metal in the feeder head is removed from the cast product. It also requires that the outline of the cast product correspond to that of the desired product. These features are not seen in the present claims. At the same time, the claims of the present application require heat insulating of

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the feeder head to be greater than that of the cavity which is not seen in the claims of the copending application. Accordingly, Applicants submit that the claims of the present application are not obvious over the claims of the copending application 10/097,483.

Likewise, Applicants submit that the present claims are not obvious over claims 1-9 of copending application 10/115,141. Claim 1 of that application requires a sprue, which is not required in the present claim. Further, the claims of copending application requires that the metal is sequentially solidified in a direction from the terminal portion of the cavity to the feeder head portion. The claims in the present application do not require such a sequential solidification. Accordingly, Applicants submit that the present claims are not obvious over the claims of this application.

Likewise, Applicants submit that the present claims are not obvious over the claims of copending application 10/166,743. Claim 1 of that application requires a non-oxidizing atmosphere inside the cavity. Such an atmosphere is not required in the present claims. At the same time, the present claims require the heat insulating of the feeder head and the different cooling rates of the feeder head and cavity. Also, the present claims require the supplementing of the molten metal as it solidifies and shrinks, which is not required in the copending application. Accordingly, Applicants submit that the present claims are not obvious over the claims of that application either.

No Prosecution History Estoppel

Claim 1 is hereby presented in independent form. No prosecution history estoppel would apply to the interpretation and limitations set forth in claim 1 and the claims that

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depend therefrom in view of the fact that this subject matter has been continuously presented since the original filing date of the present application.

Conclusion

In view of the above remarks, it is believed that the claims clearly distinguish over the patents relied on by the Examiner, either alone or in combination. In view of this, reconsideration of the rejections and allowance of all the claims are respectfully requested.

Should there be any outstanding matters which need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number of the undersigned below to conduct an interview in an effort to expedite prosecution in connection with the present application.

Attached hereto is a marked-up version of the changes made to the application by this Amendment.

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If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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0038-0358P

Attachment

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

The claims have been amended as follows:

1. (Amended) A method of casting in a casting machine including a casting die, in which a feeder head is provided between a metal inlet and a cavity and in which heat insulating of the feeder head is greater than that of the cavity so as to make cooling rate of the feeder head lower than that of the cavity, said method comprising the steps of:

pouring a molten metal into the cavity;

reacting the molten metal [on] with a deoxidizing compound in the cavity so as to deoxidize an oxide film formed on a surface of the molten metal; and
supplementing the molten metal in the feeder head to the cavity when the molten metal in the cavity is solidified and shrunk.

4. (Amended) The method according to claim 1,
wherein an inner face of the feeder head is coated with heat insulating lubricant,
and
an inner face of the cavity is [coated with no] free of heat insulating lubricant.